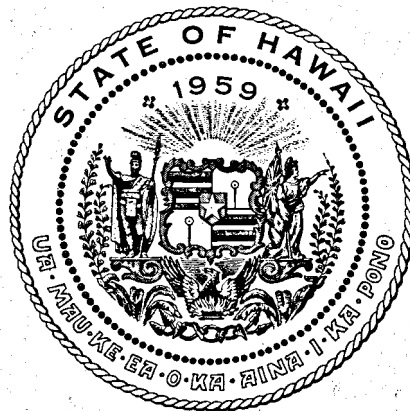


REGULATIONS ON LEASING OF GEOTHERMAL RESOURCES AND DRILLING FOR GEOTHERMAL RESOURCES IN HAWAII

REGULATION 8



DEPARTMENT OF LAND AND NATURAL RESOURCES

State of Hawaii

GEORGE R. ARIYOSHI

Governor

BOARD OF LAND AND NATURAL RESOURCES

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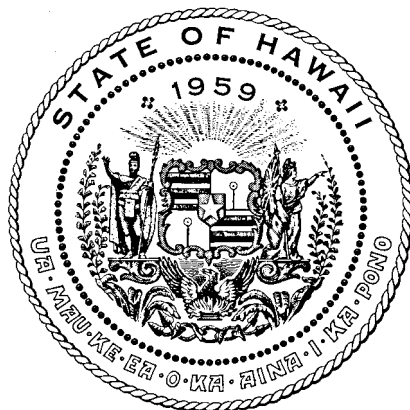
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DEPARTMENT OF LAND AND NATURAL RESOURCES

June 1978

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PART I — LEASING OF GEOTHERMAL RESOURCES

RULE NO. 1 GENERAL

1.1 Purpose.

The purpose of these regulations is to provide for the leasing of State and reserved lands for the purpose of geothermal resources exploration, development and production and to provide for the regulation of all drilling for geothermal resources in Hawaii in order to prevent waste and to conserve and provide for optimum use of geothermal resources, to prevent waste, pollution and degradation of surface and ground water and other natural resources, to protect the environment, and to prevent injury to life and property.

1.2 Authority.

These rules are promulgated pursuant to the jurisdiction and authority of the Board of Land and Natural Resources provided in Chapters 177, 178, and 182 of the Hawaii Revised Statutes.

1.3 Incorporation by Reference.

Any document or part therein incorporated by reference herein is a part of these regulations as though set out in full.

1.4 Revisions.

These regulations may be revised or repealed at any time by the Board in accordance with the provisions of Chapter 91 of the Hawaii Revised Statutes. With respect to any mining leases authorized and issued by the Board, no revision or repeal of these regulations after the effective date of such a lease shall change the provisions relating to rental, royalty rate, or term or otherwise substantially change the economic terms thereof; provided, however, that the State of Hawaii acting in its governmental capacity, may by such regulations or amendments thereto regulate the drilling, location, spacing, testing, completion, production, operation, maintenance and abandonment of a well or wells or similar activity as well as the construction, operation and maintenance of any power plant or other facilities in the exercise of its police powers to protect the public health, welfare and safety as provided in these Regulations.

1.5 Definitions.

For purposes of these regulations, unless otherwise indicated herein by express term or by context, the term:

“*Board*” means the Hawaii Board of Land and Natural Resources.

“*Chairman*” means the Chairman of the Hawaii Board of Land and Natural Resources or his designated representative.

“*Commercial quantities*” means quantities sufficient to provide a return after current production and operating costs have been met.

“*Department*” means the Hawaii Department of Land and Natural Resources.

“*Force Majeure*” means any fire, explosion, flood, volcanic activity, seismic or tidal wave, mobilization, war (whether declared or undeclared), act of any belligerent in any such war, riot, rebellion, the elements, power shortages, strike, lockout, difference of workers, any cause which prevents the economic mining of the geothermal resources, restraints by courts or other governmental authorities, failure or unreasonable delay by governmental authorities in issuance of permits or approvals or any other cause beyond the reasonable control of the parties affected, whether or not of the nature or character hereinabove specifically enumerated.

“*Geothermal By-product*” means (1) any mineral or minerals (exclusive of oil, hydrocarbon gas and helium) which are found in solution or developed in association with geothermal resources and (2) demineralized or desalted effluent water.

“*Geothermal resources*” means the natural heat of the earth, the energy, in whatever form, below the surface of the earth present in, resulting from, or created by, or which may be extracted from such natural heat, and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases and steam, in whatever form, found below the surface of the earth, but excluding oil, hydrocarbon gas or other hydrocarbon substances.

“*Mining lease*” means a lease of the right to conduct geothermal operations on State lands or reserved lands to discover, develop, produce, and utilize geothermal resources therein. Unless the context indicates otherwise, “lease” or “geothermal lease” means “mining lease”.

“*Mining lessee*” means any person as defined herein to whom a mining lease has been granted including his transferee, assignee, sublessee or successor in interest. It also

means any agent of the mining lessee or an operator holding authority by or through the mining lessee. Unless the context indicates otherwise "Lessee" means "mining lessee".

"*Mining operations*" means the process of excavation, extraction, and removal of minerals, and the development of any and all geothermal resources, from the ground, design engineering, other engineering, erection of transportation facilities and port facilities, erection of necessary plants, other necessary operations or development approved by the board preceding or connected with the actual extraction of minerals and the development of geothermal resources.

"*Occupier*" means any person who owns in fee the surface of the land or any person entitled to the possession of land under a certificate of occupation, a nine hundred and ninety-nine year homestead lease, a right of purchase lease, a cash freehold agreement, or under a deed, grant, or patent, and any person entitled to possession under a general lease from the State of Hawaii, and also means and includes the assignee of the right to a mining lease from any one of the above.

"*Operator*" means any person as defined herein engaged in drilling, maintaining, operating, producing and/or having control or management of any geothermal well or the development of geothermal resources. The operator may be the landowner, the lessee, designated operator, or agent of the lessee or holder of rights under an approved operating agreement.

"*Person*" means a United States citizen of legal age, association of such citizens, firms and corporations organized under the laws of the United States, any State or District of Columbia and qualified to do business in the State of Hawaii, including any governmental unit, trust or estate.

"*Reserved lands*" means those lands owned or leased by any person in which the State or its predecessors in interest has reserved to itself, expressly or by implication the minerals or right to mine minerals, or both.

"*State lands*" includes all public and other lands owned by or in possession, use and control of the State of Hawaii or any of its agencies.

"*Unit agreement*" means an agreement or plan of development and operation for the production and utilization of geothermal resources as a single consolidated unit without

regard to separate ownerships and which provides for the allocation of costs and benefits on a basis defined in the agreement or plan.

"*Waste*" means the unnecessary or excessive dissipation or loss of geothermal resources resulting from the location, spacing, drilling, equipping, operation or production of a geothermal resources well or wells, or with respect to the production, gathering, transportation, storage, handling or utilization of geothermal resources.

RULE NO. 2 GEOTHERMAL EXPLORATION PERMITS

2.1 Exploration Permit Required on State and Reserved Lands.

An exploration permit is required to conduct any exploration activity which relates to the search on State or reserved lands for evidence of geothermal resources. Such exploration activity includes, but is not limited to, geophysical operations, drilling of shallow temperature test holes less than 500 feet in depth, or deeper as may be determined by the Board, construction of roads and trails, and cross-country transit by vehicle over State lands. All other drillings on State or reserved lands shall be regulated under Part II of these regulations.

2.2 Application for Exploration Permits.

Any person may apply for an exploration permit on any State or reserved land by submitting a written application to the Board containing the following:

- a. The name and address of the person, association, or corporation for whom the operations will be conducted and of the person who will be in charge of the actual exploration activities.
- b. A description of the type of exploration activities proposed to be undertaken.
- c. A description of the lands to be explored.
- d. A map or maps, available from State or Federal sources, showing the lands to be entered or disturbed.
- e. The approximate dates of the commencement and termination of exploration activities.
- f. A statement by applicant agreeing to submit to the Board within 20 calendar days after notification by the Board that the permit application has been approved a surety company bond in the amount of \$10,000.00 payable to the State of Hawaii conditioned upon compliance with all

terms and conditions of the exploration permit. If any person holds more than one exploration permit in the State of Hawaii, that person may file with the Board, in lieu of separate bonds for each exploration permit, a blanket bond in the amount of \$50,000.00.

- g. The name and address of the surface owner of the land.
- h. Evidence that the owner and surface lessee, if any, has or has not consented to the entry upon his or their land and a description of the efforts made and the reasons for not securing the consent, if that is the case.

2.3 Permit Filing Fee.

Each application shall be accompanied by a non-refundable filing fee in the amount of \$100.

2.4 Number of Permits.

There shall be no limitation as to the number of permits which may be applied for by any one person.

2.5 Approval of Permit Applications.

All applications shall be subject to the approval of and the terms and conditions set by the Board. Any application for a geothermal exploration permit not approved within 60 calendar days after the date of receipt of the application shall be resubmitted unless the same has been extended by the Board.

2.6 Non-Exclusive Permits.

Geothermal exploration permits under Rule 2 allow only non-exclusive access to State or reserved lands for geothermal exploration activity prescribed in Rule 2.1 and do not provide any preference rights to a mining lease of the lands explored by such permits. In the event an exploration permit is in effect on or issued after the commencement date of a mining lease covering all or part of the same State or reserved lands, such permittee's rights shall be subordinate to the lessee's rights and the permittee's exploration activities shall not unreasonably interfere with or prevent the mining lessee's use of the leasehold.

2.7 Duration of Permits.

Exploration permits shall be valid for a period of one year from date of issuance, but may be renewed for an additional period of time at the discretion of the Board.

2.8 Confidentiality of Exploration Results.

Within 60 days after the termination date of an exploration permit, the permit holder shall submit the results of the exploration to the Chairman of the

Board, which result shall be kept confidential by the Board. If the permit holder makes an application for a geothermal mining lease of the lands explored within a period of 6 months from the date the results are submitted to the Board, the Board shall continue to keep such results confidential until a lease for such lands has been issued or 3 years from the date of submission of the data, whichever is sooner. If the permit holder does not make an application for a geothermal mining lease or leases, as the case may be, of the lands explored within a period of 6 months from the date the results are submitted to the Board, the Board at its discretion need not keep the results confidential.

2.9 Departmental Investigation.

The Department may conduct scheduled and unscheduled inspections and investigations of operations conducted under geothermal exploration permits.

2.10 Suspension of Permits.

The Chairman may issue an order immediately suspending operations conducted under a geothermal exploration permit if the permittee is in violation of any terms or conditions of the permit or, in the judgment of the Chairman, such operations jeopardize the public health, safety, and welfare. Any suspension shall be referred to and reviewed by the Board at its next regular meeting.

2.11 Cancellation of Permits.

The Board may cancel an exploration permit if it finds, after notice to the permittee and allowance for an opportunity for hearing and compliance with the requirements of the permit, that permit requirements are not being observed.

2.12 Compliance With Applicable Laws.

The permittee shall be required to comply with the requirements of all Federal, State and applicable County laws, rules and regulations.

RULE NO. 3 GEOTHERMAL MINING LEASES

3.1 Geothermal Mining Leases.

The Board may, in accordance with these regulations grant mining leases conveying to the lessee the exclusive rights to drill, discover, develop, operate, utilize, and sell geothermal resources on state and reserved lands, subject, however, to the Board's right to issue exploration permits on the leased land for the sole purpose of evaluating the extent of geothermal resources existing on adjacent state or reserved land. The Board shall set forth the terms and conditions of such a mining lease prior to the public auctioning or granting without public auction.

3.2 Geothermal Resources Available for Leasing.

All State and reserved lands shall, at the discretion of the Board, be considered available for geothermal mining leases.

3.3 Persons Eligible to Hold Leases.

Any person as defined in Rule 1.5 of these regulations shall be eligible to lease geothermal resources in State or reserved lands or take or hold an interest therein, unless said person is in arrears in the payment of taxes, rents or other obligations owing the State or any of its political subdivision.

3.4 Mining Leases by Public Auction.

Mining leases on State lands shall be granted only on a competitive bid basis at public auction as provided in Rule 4.

3.5 Mining Leases Without Public Auction.

Mining leases on reserved lands may be granted on a competitive bid basis by public auction; or without public auction to the occupier or to his assignee of the rights to obtain a mining lease, upon the vote of two-thirds of the Board members, pursuant to Sec. 182-5, HRS.

3.6 Size of Leaseable Tract.

Unless otherwise approved by the Board a geothermal mining lease shall not embrace an area of more than 5,000 acres of contiguous land. However, no lease shall grant and include an area of more than 2,560 acres of contiguous land if that area's longest dimension is six times greater than its narrowest dimension. A geothermal mining lease shall embrace an area of not less than 100 acres, unless the Board, at its discretion, deems otherwise.

3.7 Transfer of Mining Leases; Overriding Royalty Interests.

- a. Any transfer of a mining lease which includes the assignment or sublease thereof, shall be subject to the approval of the Board and pursuant to the law. No transfer to a minor, except to an heir or devisee will be permitted. All applications for approval of transfers must be accompanied by a non-refundable fee of \$100.00 for each assignment.
- b. Upon approval of the Board a mining lease may be transferred in whole or in part, to a transferee who shall have the same qualifications as any bidder for a mining lease. The transferee shall be bound by the terms of the lease to the same extent as if the transferee were the original lessee. The

Board may release the transferor from any liabilities or duties under the mining lease as to the portion thereof transferred except for any liability or duty which arose prior to the approval of the transfer by the Board and which remains unsatisfied or unperformed.

- c. No transfer shall be effective until written approval is given.
- d. A lease may be transferred as to all or part of the acreage included therein to any person qualified to hold a State lease, provided that neither the transferred nor the retained part created by the transfer shall contain less than 100 acres unless the Board at its discretion approves otherwise. No undivided interest in a lease of less than 10% shall be created by any voluntary transfer.
- e. The transferor and his surety shall continue to be responsible for performance of any and all obligations under the lease unless released by the Board. After the approval of any transfer, the transferee and his surety shall be bound by the terms of the lease to the same extent as if the transferee were the original lessee, any conditions in the transfer to the contrary notwithstanding.
- f. Where a transfer does not convey separate interest in the record title to the lease, the transferee, if the transfer so provides, may become a joint principal on the bond with the transferor. The application must also be accompanied by a consent of the surety to remain bound under the bond of record, if the bond, by its terms, does not contain such consent. If a party to the transfer has previously furnished a statewide bond, no additional showing by such party is necessary as to the bond requirement.
- g. Overriding royalty interests in geothermal leases constitute accountable acreage holdings under these regulations and shall be based on the percentage of overriding royalty multiplied by the acreage involved. If an overriding royalty interest is created which is not shown in the instrument of transfer, a statement must be filed with the Chairman describing the interest. Any such transfer shall be accompanied by a statement over the transferee's signature that the transferee is a person as defined in these rules and that his interests in geothermal leases do not exceed any acreage limitations established. All transfers of overriding royalty interests without a

working interest and otherwise not contemplated by Rule 3.7 must be filed for record in the office of the Department in Honolulu within ninety (90) days from the date of execution. Such interests will not require approval.

3.8 Revocation of Mining Leases.

A mining lease may be revoked by the Board if the lessee fails to pay rentals and/or royalties when due or fails to comply with any of the other terms of the lease, law, or regulations, or if the lessee wholly ceases all mining operations for a period of one year without the written consent of the Board for reasons other than force majeure or the production of less than commercial quantities of geothermal resources or by-products. However, before revocation of a lease for defaults other than the failure to pay rents and/or royalties when due, the Board shall give the lessee written notice of the claimed default and an opportunity to be heard within 30 days of such notice. The lessee shall be allowed 60 days to correct such default or, if the default is one that cannot be corrected within 60 days to commence in good faith and thereafter proceed diligently to correct such default, following written notice of a determination after hearing by the Board that such default exists. Failure to comply with the foregoing shall be deemed sufficient cause for revocation. Defaults arising because of failure to pay rents and/or royalties when due must be cured within 60 days of a written notice of default; otherwise the lease may be revoked. In the alternative, the lessee may surrender the lease pursuant to Rule 3.9.

Upon the revocation of a geothermal mining lease, lessor shall have the right to retain the improvements or require the lessee to remove the same and restore the premise to a similar condition prior to any development or improvements, to the extent reasonably possible in addition to imposing any penalties as provided by law or regulations.

3.9 Surrender of Mining Leases.

Any lessee of a mining lease, who has complied fully with all the terms, covenants, and conditions of an existing lease and provisions of these Regulations, may, with the consent of and under such terms and conditions set by the Board surrender at any time and from time to time all or any part of the mining lease or the land contained therein upon payment as consideration therefor two years' rent prorated upon the portion of the lease or land surrendered pursuant to Section 183-13 of Chapter 182, HRS, unless the law provides otherwise. Upon any such approved surrender, the lessee shall be relieved of all further obligations with respect to the lands so surrendered except for previous activities conducted

on the land or under the lease. A mining lease may also be surrendered if as a result of a final determination by a court of competent jurisdiction, the lessee is found to have acquired no rights in or to the minerals on reserved lands, nor the right to exploit the same, pursuant to the lease, and, in such event, the lessee shall be reimbursed for all rentals, royalties and payments paid to the State pursuant to the lease. The lessee shall be entitled to all equipment, buildings and plants placed on the land surrendered and the lessor may require the lessee to remove the same and restore the premises to a similar condition prior to any development or improvements, to the extent reasonably possible.

3.10 Number of Mining Leases; Undeveloped Acreage Limitations.

There shall be no limit on the number of geothermal mining leases that may be granted to a person undertaking any geothermal mining operation or production, unless otherwise authorized by law.

However, no person, unless it is a charitable trust existing in the State of Hawaii on the effective date of these regulations, shall take hold, own, or control at any one time, whether acquired from the Board under these Rules by lease or approved transfer of lease, or indirectly, a divided or undivided interest in geothermal resources in State or reserved lands in excess of 80,000 undeveloped acres. This acreage limitation may be increased by the Board where, in the opinion of the Board, such increase is in the best interest of the State in the promotion and development of geothermal resources.

In computing total holdings, ownership, or control, no person shall be charged with an interest through any association, firm or corporation unless he is the beneficial owner of 10 percent or more of the stock or other instruments of ownership or control of such association, firm, or corporation. In such a case and in the case of an undivided interest, the amount of acreage chargeable to the person shall be the pro-rata amount of acreage based on the percentage of stocks or interest owned. Persons owning an overriding royalty or other interest determined by or payable out of a percentage of production from a lease will be charged with an interest. Undeveloped acreage which subsequently is unitized with the approval of the Board or is actually producing geothermal resources in commercial quantities and paying production royalties shall not be included in accountable interests in determining the 80,000-acre undeveloped acreage limitation. Any and all leases creating the excess undeveloped acreage may be canceled or forfeited in their entirety by the Board. A person may hold an unlimited interest in acreage which is producing geothermal resources and paying production royalties.

3.11 Term of Mining Leases.

- a. The term of all mining leases shall consist of a primary ten-year period and continuation periods which shall be as provided herein, except that the sum of primary and all continuation periods of such leases shall not exceed 65 years from the effective date. The effective date of all leases shall be the first day of the month following the Board's signing of the lease.
- b. If during the primary period of a mining lease, geothermal resources or by-products are being produced or utilized in commercial quantities, that lease shall continue for so long thereafter as geothermal resources or by-products are produced or utilized in commercial quantities except for the 65-year limit provided in Rule 3.11a. Production or utilization of geothermal resources in commercial quantities for purposes of this paragraph "b" shall be deemed to include the completion of one or more wells producing or capable of producing geothermal resources for delivery to or utilization by a facility or facilities not yet installed but scheduled for installation not later than fifteen years from the date of commencement of the primary term of the lease.
- c. If, at the end of the primary term of a mining lease, geothermal resources are not being produced from the leased land, but the lessee is actively engaged in drilling operations under said lease below the depth of 1,000 feet or at a lesser depth of productive zone in a diligent manner, that lease may be continued, at the discretion of the Board, for a period of not more than five years and for as long thereafter as geothermal resources are being produced or utilized in commercial quantities except for the 65-year limit provided in Rule 3.11a.
- d. If the Board determines that the lessee has voluntarily shut in production for lack of a market but is proceeding diligently to acquire a contract to sell or to utilize the production or is progressing with installations needed for production, the lease shall be continued in force for the duration of the primary period or for five (5) years after shut-in, whichever is longer, upon payment of rentals, otherwise the lease may be terminated by the Board. The Chairman shall continue to review shut-in leases not less frequent than every five (5) years until production in commercial quantities occurs or

the lease is terminated by the Board for lessee's lack of due diligence or surrendered by the lessee.

- e. If production of geothermal resources under a lease should cease from any cause, after expiration of the primary term, or before the end of the primary term if production has commenced, such lease shall continue so long as lessee actively and continuously engages in drilling or reworking operations which shall be commenced within 180 days after cessation of production. Continuous drilling or reworking operations shall be deemed to have occurred if no more than 180 days elapse between cessation of operations on one well and commencement of operations on the same or another well. If such operations are successful, the lease shall continue for so long thereafter as geothermal resources are produced or utilized in commercial quantities, except for the 65-year limit provided in Rule 3.11a.
- f. If the lessee is rendered unable wholly or in part by force majeure to carry out its obligations under a lease, lessee shall give to lessor prompt written notice of the force majeure. Thereupon, any obligations of the lessee to perform so far as they are affected by the force majeure shall be suspended during the continuance of the force majeure and the primary term or any continuation period shall be extended for a period equal to the period of suspended performance caused by the force majeure. Lessee shall use all possible diligence to remove or correct the force majeure, but this shall not require the settlement of strikes, lockouts or other labor difficulties. In no event shall any extension affect the 65-year term of any lease.

3.12 Rentals.

- a. The lessee of a mining lease shall pay to the State of Hawaii in advance each year the annual rental specified for each acre or fraction thereof under the lease. The annual rental for the first year of the lease shall be due and payable and shall be received in the office of the Department in Honolulu within two days after the acceptance of the bid by the Board and the \$500 bid deposit shall be credited against such sum. Where a lease is granted without public auction, the Board may impose such other terms and conditions for first-year rental payment. Second year and subse-

quent rental payments must be received in the office of the Department in Honolulu on or before the anniversary date of the lease.

- b. Annual rentals for each acre or fraction thereof under lease shall be at the price bid at public auction or as set by the Board, as the case may be. The annual rental due and paid each year shall be credited against production royalties due and accrued during that same year, if there be any. The annual rental due a given year shall not be credited against production royalties due in future years.

3.13 Royalties on Geothermal Production.

- a. The rate of the royalty to be paid to the State of Hawaii for the production of geothermal resources shall be determined by the Board prior to the bidding for or granting of a mining lease, but the rate shall not be less than ten (10) percent nor more than twenty (20) percent of the gross amount or value of the geothermal resources produced under the lease as measured at the wellhead and sold or utilized by the lessee. The Board may readjust the rate of royalty of any geothermal mining lease at not less than 15-year intervals beginning thirty-five years after the effective date of such lease. In the event of any such readjustment, the rate of royalty may not be increased by more than 50 percent over the royalty paid during the preceding period. The Board shall give notice of any proposed readjustment of royalties and unless the lessee files with the Board objection to the proposed royalties or surrenders the lease within thirty days after receipt of such notice, the lessee shall conclusively be deemed to have agreed with such terms and conditions. If the lessee files objections and no agreement can be reached between the Board and the lessee within a period of not less than sixty days, the lease may be terminated by either party. In no event shall the rate of such royalty payable exceed 20 percent of the gross value. In addition to the above, the Board may also impose a royalty based on a percentage of the net profit, cash bonus or otherwise.
- b. For the purpose of computing royalties, the amount or value of geothermal resources produced shall be determined as the gross proceeds received by the mining lessee from the sale or use of geothermal resources produced from the leased land as measured at the wellhead. In the event that geothermal production hereunder is not sold to a third party but used or furnished to a plant owned or controlled by the lessee, the gross proceeds of such production for purposes of computing royalties shall be that which is reasonably equal to the gross proceeds being paid to other geothermal producers for geothermal resources of like quality and quantity under similar conditions after deducting any and all treating, processing and transportation costs incurred. In such cases of furnished geothermal resources should the Board believe that any stated charges imposed and deducted are excessive or that the stated sales price received by the lessee is unreasonable, the lessee shall upon thirty (30) days notice, provide the Board with evidence that the charges or price or both comply with the above requirement of reasonably equal gross proceeds. Gross proceeds shall not be deemed to include excise, production, severance or sales taxes or other taxes imposed on the lessee by reason of the production, severance or sale of geothermal resources or geothermal by-products.
- c. The rate of royalty to be paid to the State of Hawaii for any geothermal by-product contained in and extracted from the effluence produced shall be not less than 5 percent nor more than 10 percent of the gross proceeds received by the lessee from the sale of any such by-product produced under the lease as measured at the wellhead and sold, exchanged or otherwise disposed of by the lessee, including demineralized or desalted water, after deducting any treating, processing and transportation costs incurred, if applicable. No payment of a royalty will be required on such water if it is used in plant operation for cooling or generation of electric energy or is reinjected into the subsurface. No royalty shall be paid for geothermal by-products used or consumed by lessee in his production operations. The Board may readjust the rate of royalties for the production of geothermal by-products in the same manner and under the same terms prescribed in Rule 3.13a except that the rate of royalty for geothermal by-products payable shall not exceed 10 percent of the gross proceeds. Gross proceeds shall not include the taxes described in paragraph "b" above.

- d. The lessee shall make payment of royalties to the Board in Honolulu within thirty days after the end of each calendar month and accompany such payment with a certified true and correct written statement by the lessee, showing the amount of each geothermal resource produced, sold, used, and otherwise disposed of, and the basis for computation and determination of royalties. Lessee shall furnish such other data as may be necessary to enable the Board to audit and verify all royalties due and payable to the State of Hawaii.
- e. Metering equipment shall be maintained and operated by lessee in such a manner as to meet acceptable standards of accuracy consistent with geothermal industry practices. Use of such equipment shall be discontinued at any time upon determination by the Chairman that standards of accuracy or quality are not being maintained and, if found defective, the Chairman will determine the quantity and quality of production from the best evidence available.
- f. The lessee shall furnish the Chairman the results of periodic tests showing the content of by-products in the produced geothermal resources. Such tests shall be taken as specified by the Chairman and by the method of testing approved by him, except that tests not consistent with industry practice shall be conducted at the expense of the State of Hawaii.

3.14 Commingling.

Lessee shall have the right, at its election prior to sale, to commingle geothermal resources produced from the leased land with that produced from other leases held by him or by other lessees as specified in the lessee's approved plan of operation for the lease. However, before there shall be such a commingling of geothermal production the lessee shall determine the quantities and value of such production upon which royalties are due under the lease and agrees that in making such determinations, all measurements and samples shall be made and taken in accordance with good geothermal industry practices.

3.15 Unit or Cooperative Plans.

- a. For the purpose of more properly conserving the natural resources of any geothermal pool, field or like area, lessees under leases issued by the Board may, with the written consent of the Board, utilize the State lands under a unit, cooperative or other plan of development or operation with other State,

Federal, or privately owned lands. Applications to unitize shall be filed with the Board which shall certify whether such plan is necessary or advisable in the public interest. The Board may require whatever documents or data it deems necessary. To implement such unitization, the Board may with the consent of its lessees modify and change any and all terms of leases issued by it which are committed to such unit, cooperative or other plans of development or operations.

- b. The unit agreement shall describe the separate tracts comprising the unit, disclose the apportionment of the production or royalties and costs to the several parties, and the name of the operator, and shall contain adequate provisions for the protection of the interests of all parties, including the State of Hawaii. The unit agreement shall be signed by or in behalf of all interested necessary parties before being submitted to the Board. It will be effective only after approval by the Board. The unit operator must be a person as defined by these rules and he must be approved by the Board.
- c. The owners of any right, title or interest in the geothermal resources to be developed or operated under such an agreement can be regarded as proper parties to a proposed agreement. All such owners must be invited to join as parties to the agreement. If any owner fails or refuses to join the agreement, the proponent of the agreement should declare this to the Board and should submit evidence of efforts made to obtain joinder of such owner and the reasons for nonjoinder.
- d. In lieu of separate bonds required for each lease committed to a unit agreement, the unit operator may furnish and maintain a collective corporate surety bond or a personal bond conditioned upon faithful performance of the duties and obligations of the agreement and the terms of the leases subject thereto and these Regulations. Personal bonds shall be accompanied by a deposit of negotiable Federal securities in a sum equal in value to the amount of the bond and by a proper conveyance to the Board with full authority to sell such securities in case of default in the performance of the obligations assumed. The liability under the bond shall be for such amount as the Board shall determine to be adequate to protect the interests of the

State of Hawaii. Additional bond coverage may be required whenever deemed necessary by the Board. In case of changes of unit operator, a new bond must be filed or a consent of surety to the change in principal under the existing bond must be filed with the Board.

- e. Any modification of an approved agreement will require approval of the Board under procedures similar to those cited in paragraph "a" above.
- f. The term of all leases included in any cooperative or unit plan of development or operation shall be continued automatically for the term of such unit or cooperative agreement, but in no event beyond that time provided in Rule 3.11. Rentals or royalties on leases so extended shall be at the rate specified in the lease.
- g. Any lease which is to be eliminated from any such cooperative or unit plan of development or operation, or any lease which shall be in effect at the termination of any such cooperative or unit plan of development or operation, unless relinquished, shall continue in effect for the term of the lease or for one year after its elimination from the plan or agreement or the termination thereof, whichever is longer, and so long thereafter as lessee engages in diligent and continuous drilling as provided in Rule 7.8, or so long thereafter as geothermal resources are produced in commercial quantities, but in no event beyond the time provided in Rule 3.11a.
- h. Before issuance of a lease for lands within an approved unit agreement, the lease applicant or successful bidder will be required to file evidence that he has entered into an agreement with the unit operator for the development and operation of the lands in a lease if issued to him under and pursuant to the terms and provisions of the approved unit agreement, or a statement giving satisfactory reasons for the failure to enter into such agreement. If such statement is acceptable, he will be permitted to operate independently, but will be required to perform his operations in a manner which the Board deems to be consistent with the unit operations.

3.16 Bond Requirements.

Every lessee of a mining lease or transferee thereof shall file with the Board, a bond in the amount of \$10,000.00 in a form approved by the

Board and made payable to the State of Hawaii, conditioned upon faithful performance of all requirements of Chapter 182, Hawaii Revised Statutes, of these Regulations, and of the mining lease, and also conditioned upon full payment by the lessee of all damages suffered by the occupiers, in the case of State and reserved lands. If any person, holds more than one lease in the State of Hawaii it may file with the Board, in lieu of separate bonds for each lease, a blanket bond in the amount of \$50,000.00.

3.17 Liability Insurance.

Prior to entry upon the leased lands, lessee or lessee's assignee, sublessee or transferee, as the case may be, shall cause to be secured and to be thereafter maintained in force during the term of the lease, public liability and property damage insurance from an insurance company licensed to do business in the State of Hawaii in amounts to be determined by the Board and stated in the geothermal lease for injuries to persons, wrongful death, and damages to property caused by any occupancy, use, operations or any other activity on leased lands carried on by lessee, or lessee's assignee, sublessee or transferee, as the case may be, its agents or contractors in connection therewith. Liability coverage for explosion, collapse and underground hazards are to be included prior to any drilling of a well for geothermal discovery, evaluation or production. Lessee shall evidence such additional coverage to the Chairman prior to initiation of drilling operations. If the land surface and improvements thereon covered by the lease have been sold or leased by the State of Hawaii to a person other than the lessee, the owner or lessee of surface rights and improvements shall be a named insured. The State of Hawaii, any owner and any lessee of surface rights and improvements shall be a named insured in all instances. This policy or policies of liability insurance shall contain the following special endorsement:

"The State of Hawaii, the Hawaii State Board of Land and Natural Resources, the Chairman of the Board of Land and Natural Resources, the Department of Land and Natural Resources, and (herein insert name of owner or lessee of surface rights, if applicable) and the officers, employees and agents of each and every of the foregoing (hereinafter referred to as "named insureds") are insureds under the terms of this policy, provided, however, said insureds shall not be insured hereunder for any primary negligence or misconduct on their part, but shall be insured hereunder for secondary negligence or misconduct, which shall include the failure to discover and cause to be corrected the negligence or misconduct of lessee, its agents or contractors. This insurance policy will not be cancelled without thirty (30) days prior written notice to the Board and all named insured. None of the foregoing additional insureds is liable for the payment of premiums or assessments on this policy."

No cancellation provision in any insurance policy shall release the lessee of the duty to furnish

insurance during the term of this contract. Said policy or policies shall be underwritten to the satisfaction of the Chairman. A signed and complete certificate of insurance, with the endorsement required by this paragraph, shall be submitted to the Chairman prior to entry upon the leased land. At least thirty (30) days prior to the expiration of any such policy, a signed and complete certificate of insurance, with the endorsement required by this paragraph, showing that such insurance coverage has been renewed or extended, shall be filed with the Chairman.

3.18 Hold Harmless.

In addition to the insurance requirements of Rule 3.17 (Liability Insurance) the mining lessee shall expressly agree to hold harmless and indemnify the State of Hawaii and its divisions, departments, agencies, officers, agents and employees, together with the owner or lessee of the surface rights of the leased land, if any, from any and all liabilities and claims for damages and/or suits for or by reason of death or injury to any person or damage to property of any kind whatsoever, whether the person or property of mining lessee, his agents, employees, contractors, or invitees, or third persons, from any cause or causes whatsoever caused by any occupancy, use, operation or any other activity on the leased land or its approaches, carried on by the mining lessee, his agents, employees, contractors, or invitees, in connection therewith; and the mining lessee shall covenant and agree to indemnify and save harmless the State of Hawaii, the Board, the Chairman, the Department, owner or lessee of surface rights if there be one, and their officers, agents, and employees from all liabilities, charges, expenses (including counsel fees) and costs on account of or by reason of any such death or injury, damage, liabilities, claims, suits or losses.

3.19 Title.

The State of Hawaii does not warrant title to the leased lands or the geothermal resources and associated by-products which may be discovered thereon; the lease is issued only under such title as the State of Hawaii may have as of the effective date of the lease or may thereafter acquire. If the interest owned by the State in the leased lands includes less than the entire interest in the geothermal resources and associated by-products for which royalty is payable as determined by the courts or otherwise, then the rents and royalties provided for in the lease shall be paid to the State only in the proportion which its interest bears to said whole for which royalty is payable, and the State shall be liable to such persons for any prior payments made as adjudged by the courts or otherwise; provided, however, that the State shall not be liable for any damages sustained by the lessee.

The geothermal resources shall be considered as a property right.

RULE NO. 4 PROCEDURES FOR LEASING OF STATE LANDS

4.1 Application to Board; Filing Fee.

Any person as defined in these regulations may apply to the Board for a mining lease on State lands or the Board at its discretion may offer such lands for lease. The applicant shall submit three copies of a written application on forms provided by the Department and all application forms must be completed in full, signed by the applicant or his authorized representative with proof of authorization, three (3) copies of all necessary exhibits, and the filing fee.

Each application for a mining lease shall be accompanied by a nonrefundable filing fee in the amount of \$100.00

4.2 Lease Application Exhibits.

Each application for a geothermal mining lease shall be accompanied by the following exhibits:

- a. An accurate description and map of the land desired to be leased.
- b. A description of the known or potential geothermal resource desired to be leased for exploration and development.
- c. Brief preliminary proposal of plan for geothermal exploration and development and an assessment of the environmental impact from geothermal resource exploration and development.
- d. Certificate that the applicant is qualified to hold a mining lease under Rule 3.3 and that the officer executing the application is authorized to act on behalf of the partnership, corporation or association, as the case may be, and that geothermal interests held do not exceed the acreage limitation prescribed in Rule 3.10.
- e. Information furnished by the applicant shall be kept confidential by the Board until the land has been offered for leasing at public auction and for such additional period of time as the Board may deem necessary. Only a description of the land nominated for leasing may be made public by the Board.

4.3 Public Notice of Lease Applications.

As soon as practicable after receipt of an application, a notice of the lease application shall be published in a newspaper of general circulation in the

county where the land nominated for leasing is located at least once in each of three successive weeks, describing the land nominated for leasing.

4.4 Consideration of Applications.

Within twelve weeks from the date of the first publication of notice of a lease application for State land or as soon as practicable thereafter, the Board may hold a public hearing to decide whether or not to lease the land and if deemed appropriate may modify the area sought to be leased. Prior to making its decision, the Board may require an applicant to submit a full evaluation of the potential effect of geothermal exploration and development on the environment, fish and wildlife resources, aesthetics, population, and other resources in the area. This evaluation will consider the potential impact of possible geothermal development and utilization including the construction of power generating plants and transmission facilities. The Board shall consider the views and recommendations of other governmental agencies, organizations, industries and lease applicants and shall consider all other potential factors, such as use of the land and its natural resources, the need for geothermal energy development and socio-economic conditions consistent with multiple-use management principles. The Board's decision whether or not to lease and selection of the area to be offered for lease shall be final and not subject to judicial review.

4.5 Rejection of Lease Applications.

If the Board determines that the existing or reasonably foreseeable future use of the land being sought for lease would be of greater benefit to the State than the proposed mining use of the land, it may disapprove the application for a mining lease of the land.

4.6 Approval of Lease Applications.

If the Board determines that the proposed mining use of the land would be of greater benefit to the State than the existing or reasonably foreseeable future use of the land, the Board shall determine the area to be offered for lease and determine any special terms and conditions to be included in the lease to provide for orderly and optimum geothermal development, to protect the environment, to permit use of the land for other purposes, and to protect other natural resources.

4.7 Public Notice of Lease Sales.

When the Board has approved a mining lease to be offered for sale by competitive bidding at public auction, it shall cause a notice to be published in a newspaper of general circulation in the State and in the county where the land is located at least once in

each of three successive weeks, setting forth the time and place of public auction, the description of the land, the geothermal rights to be leased, and the terms and conditions of the lease sale including upset or minimum rental rate, royalties, cash bonus, percentage of the net profit or otherwise. The notice shall also indicate that a proposed plan of operation must be filed and approved before the lessee shall be permitted to commence operations of any kind.

4.8 Qualification of Bidders.

At least 30 days before the announced date of any public auction, all bidders shall have submitted to the Board evidence of their experience and financial ability to conduct geothermal explorations, drill geothermal wells, and develop geothermal resources.

4.9 Bidding Requirements.

On or before the announced date of the public auction, each prospective bidder shall deposit with the Board a certified or cashier's check payable to the State of Hawaii in the amount of \$500 and submit a statement that the person is eligible to hold a mining lease as prescribed in Rule 3.3. The deposit shall be forfeited by prospective bidders who fail to bid or returned to the unsuccessful bidders.

4.10 Award and Execution of Leases.

The lease offered for bid shall be awarded to the highest responsible qualified bidder. However, the right to reject any and all bids or waive any defects which will be in the best interest of the State, is reserved to the Board. If the Board fails to award the lease within 60 days after the date of the public auction, all bids for that lease will be considered rejected. Deposits on rejected bids shall be returned. Within two days after acceptance by the Board of the highest responsible bid, the successful bidder shall pay to the Board the amount of the first year's rental bid and the \$500 deposit shall be credited against such sum.

Three copies of the lease will be sent to the successful bidder who shall within 30 days from delivery thereof be required to execute and return them, and to file the required bond or bonds. When the three copies of the lease are executed by the successful bidder and returned to the Chairman, the lease will be executed by the authorized officers of the Board and a copy will be mailed to the lessee. If the successful bidder fails to execute the lease or otherwise comply with the applicable regulations, his deposit will be forfeited.

RULE NO. 5
PROCEDURES FOR LEASING OF RESERVED
LANDS

5.1 Application to Board.

Applications for mining lease on reserved lands shall be made to the Board in accordance with Rules 4.1, 4.2, 4.5 and 4.6.

5.2 Approval of Leasing by Public Auction.

If the occupier or his assignee of the right to obtain a mining lease should fail to apply for a mining lease within six months from the date of notice from the Board of its finding that it is in the public interest that the geothermal resources in the reserved lands be mined, a mining lease shall be granted by public auction under Rule 4, provided that the bidders at the public auction shall bid on an amount to be paid to the State for a mining lease granting to the lessee the right to develop the geothermal resources reserved to the State. In any event, the Board may also require the payment of cash bonus, percentage of the net profit or otherwise.

5.3 Approval of Leasing Without Public Auction.

The Board may, by the vote of $\frac{2}{3}$ of its voting members, grant a mining lease on reserved lands to the occupier thereof or such occupier's assignee of the right to apply for a lease thereof without public auction pursuant to Sec. 182-5 HRS. The Board shall determine the annual rental to be paid to the State of Hawaii for the right to develop and utilize the geothermal resources reserved to the State and the royalty on geothermal production as prescribed in Rule 3.13. In any event, the Board may also require the payment of cash bonus, percentage of the net profit or otherwise.

RULE NO. 6
SURFACE RIGHTS AND OBLIGATIONS

6.1 Compensation to Occupiers.

The mining lessee shall negotiate in good faith with the occupier of State or reserved lands for the settlement of all claims for damages to occupier's crops, improvements, or surface of the land caused by the mining lessee's operations. The lessee shall hold the Board exempt and harmless from and against any and all such damage claims. However, nothing herein shall be construed to prevent the occupier of reserved lands from demanding and receiving rentals from the lessee of the mining lease. The occupier may in writing before or within thirty days after the public auction notify the Board that he elects to have the amount of damages and/or the amount of rentals to be paid as a result of the mining lease determined by arbitration with the successful

bidder. In such event, the occupier shall notify the successful bidder of his election to arbitrate, and the arbitration shall proceed in accordance with Chapter 658 of the Hawaii Revised Statutes. The arbitrators in fixing the amount of damages to be paid to the occupier shall award him the amount which in their judgment shall fairly compensate the occupier for the damages he may suffer to his crops or improvements or to the surface or condition of his land caused by the mining or other incidental operations, including exploratory work, and a reasonable rental for the use of the surface of the land. If the arbitrators are unable, for any reason, to determine the amount of the damages, the arbitration hearing may be continued for a reasonable time to determine more accurately the amount of damages suffered. Nothing herein shall prevent the occupier from reopening the arbitration in the event of further damages.

6.2 Mining Lessee's Rights.

The lessee shall be entitled to use and occupy only so much of the surface of leased lands as may be required for all purposes reasonably incident to exploration for, drilling for, production and marketing of geothermal resources and associated by-products produced from the leased lands, including the right to construct and maintain thereon all works, buildings, plants, waterways, roads, communication lines, pipelines, reservoirs, tanks, pumping stations or other structures necessary to the full enjoyment and development thereof, consistent with an approved Plan of Operation and amendments thereto, as provided in Rules 7.2 and 7.3.

6.3 General Conditions.

- a. Use of State lands under the jurisdiction and control of the Board are subject to the supervision of the Board. Use of State lands under the control of other State agencies are subject to the supervision of the appropriate State agency consistent with these rules.
- b. The Board reserves the right to lease, sell or otherwise dispose of the surface of State lands embraced within a mining lease, insofar as said surface is not necessary for use by the lessee in his exploration, development and production of the geothermal resources and associated by-products, but any lease, sale, or other disposal of surface rights if made, shall be subject to the rights of the mining lessee.
- c. The Chairman shall be permitted at all reasonable times to go in and upon the leased lands and premises, during the term of a mining lease, to inspect the operations and the products obtained from the leased

lands and to post any notice that the Board may deem fit and proper.

- d. During operations, the lessee shall regulate public access and vehicular traffic to cause the least practicable interference with the use of the surface of the land and to protect human life, wildlife, livestock and property from hazards associated with the operations. For this purpose, the lessee shall provide warnings, fencing, flagmen, barricades, well and hole coverings and other safety measures as appropriate. Restrictions on access must be approved by the Chairman as part of the Plan of Operations and amendments thereto required under Rule 7.2.
- e. Lessee shall take all necessary steps in the exploration, development, production and marketing of geothermal resources to avoid a threat to life or property or posing an unreasonable risk to subsurface, surface or atmospheric resources.

RULE NO. 7

GEOHERMAL MINING OPERATIONS UNDER THE LEASE

7.1 General Terms.

- a. The operator under a lease shall conduct all operations in a manner that will conform to the most prudent practices and engineering principles in use in the industry. Operations shall be conducted in such a manner as to protect the natural resources including without limitation, geothermal resources, and to obtain efficiently the maximum ultimate recovery of geothermal resources consistent with other uses of the land with minimal impact on the environment. Operations shall be conducted with due regard for the safety and health of employees. The operator shall promptly remove from the leased lands or store, in an orderly manner, all scraps or other materials not in use and shall notify the Chairman of all accidents within 24 hours and submit a written report within 30 days.
- b. The operator of a lease shall comply with all of the requirements, laws, rules and regulations of the United States, the State of Hawaii and the appropriate county pertaining to the use of said premises or conduct of the operation.
- c. The operator of a lease shall take all

reasonable precautions to prevent waste and damage to any natural resources including vegetation, forests, and fish and wildlife; injury or damage to persons, real or personal property; and degradation of the environment. The Chairman may inspect lessee's operations and issue such orders as are necessary to accomplish these purposes.

- d. The Chairman is authorized to shut down any operation which he determines are unsafe or are causing or can cause pollution of the natural environment or waste of natural resources including geothermal resources upon failure by lessee to take timely, corrective measures previously ordered by the Chairman.
- e. The lessee shall designate a local representative empowered to receive service of civil or criminal process, and notices and orders of the Chairman issued pursuant to these rules as prescribed in Rule 8.2.
- f. In all cases where exploration or mining operations are not to be conducted by the lessee but are to be conducted under an approved operating agreement, assignment or other arrangement, a designation of operator shall be submitted to the Chairman prior to commencement of operations. Such a designation will be accepted as authority of the operator or his local representative to act for the mining lessee and to sign any papers or reports required under these rules. All changes of address and any termination of the authority of the operator shall be immediately reported, in writing, to the Chairman.
- g. The lessee shall commence mining operations on the leased lands within three years from the date of execution of the lease or upon the expiration of any research period approved by the Board under Sec. 182-7(3), HRS, except that if such operator holds more than one lease this provision shall not apply to the other leases so long as the lessee is actively and on a substantial scale engaged in mining operations on at least one such lease. Notwithstanding the above, the Board may impose more stringent development requirements as to any particular lease.

7.2 Plan of Operations Required.

A lessee shall not commence operations of any kind prior to submitting to the Chairman for

Board approval of a Plan of Operations. Such a plan shall include:

- a. The proposed location and elevation above sea level of derrick, proposed depth, bottom hole location, casing program, proposed well completion program and the size and shape of drilling site, excavation and grading planned, and location of existing and proposed access roads.
- b. Existing and planned access, access controls and lateral roads.
- c. Location and source of water supply and road building material.
- d. Location of camp sites, air-strips and other supporting facilities.
- e. Other areas of potential surface disturbance.
- f. The topographic features of the land and the drainage patterns.
- g. Methods for disposing of well effluent and other waste.
- h. A narrative statement describing the proposed measures to be taken for protection of the environment, including, but not limited to the prevention or control of (1) fires, (2) soil erosion, (3) pollution of the surface and ground water, (4) damages to fish and wildlife or other natural resources, (5) air and noise pollution, and (6) hazards to public health and safety during lease activities.
- i. A geologist's preliminary survey report on the surface and sub-surface geology, nature and occurrence of the known or potential geothermal resources, surface water resources, and ground water resources.
- j. All pertinent information or data which the Chairman may require to support the Plan of Operations for the utilization of geothermal resources and the protection of the environment.
- k. Provisions for monitoring deemed necessary by the Chairman to insure compliance with these rules for the operations under the plan.
- l. The information required above for items (a) through (f) shall be shown on a map or maps of 1:24,000 scale or larger, when required by the Board.

The Board shall either approve, subject to the requirements of Chapter 343 entitled Environmental Quality Commission and Environmental Impact Statements of the Hawaii Revised Statutes and to

any terms or conditions it may specify at its discretion, or disapprove the Plan of Operation within sixty (60) calendar days after the date of receipt of the plan. If the Board disapproves the Plan of Operations it shall notify the applicant and such decision may be appealed as provided in Rule 15.

7.3 Amendments to Plan of Operations.

After completion of all operations authorized under any previously approved Plan of Operation, the lessee shall not begin to redrill, repair, deepen, plug back, shoot, or plug and abandon any well, make casing tests, alter the casing or liner, stimulate production, change the method of recovering production, or use any formation or well for brine or fluid injection until he has submitted to the Chairman in writing a new or amended Plan of Operation and has received written approval from the Chairman. However, in an emergency a lessee may take action to prevent damage without receiving prior approval from the Chairman, but in such cases the lessee shall report his action to the Chairman as soon as possible.

7.4 Drilling Operations.

- a. Upon commencement of drilling operations, the lessee shall mark each drilling site and each completed well site in a conspicuous place with his name or the name of the operator, the lease number and the number of the well. The lessee shall take all necessary means and precautions to preserve these markings.
- b. The lessee shall diligently take all necessary precautions to keep all wells under control at all times; utilize trained and competent personnel; utilize properly maintained equipment and materials; and use operating practices which insure the safety of life and property. The selection of the types and weights of drilling fluids and provisions for controlling fluid temperatures, blowout preventers and other surface control equipment and materials, casing and cementing programs, etc., to be used shall be based on sound engineering principles and shall take into account apparent geothermal gradients, depths and pressures of the various formations to be penetrated and other pertinent geologic and engineering data and information about the area.
- c. When necessary or advisable, the Chairman shall require that adequate samples be taken and tests or surveys consistent with industry practices be made without cost to the State of Hawaii, to determine the identity and character of geologic formations;

the quantity and quality of geothermal resources; pressures, temperatures, rate of heat and fluid flow; and whether or not operations are being conducted in the best interest of the public.

7.5 Waste Prevention, Offset Wells and Geothermal By-Products.

- a. All mining leases shall be subject to the condition that the lessee will, in conducting his exploratory development and producing operations, use all reasonable precautions to prevent waste and conserve and provide for optimum use of geothermal resources and other natural resources found or developed in the leased lands.
- b. If any waste of geothermal resources or by-products result from the willful misconduct or negligence of the operator or if the operator fails to take corrective action within a reasonable time after being notified in writing by the Chairman, the Board shall determine the value of such loss or waste and the compensation due to the Board, using the method for computing royalties set out in Rule 3.13(b) and (c). Payment for such losses will be paid when billed. The Board's determination of the value of the waste may be appealed as provided in Rule 15.
- c. In the event any well located on other than State or reserved land is draining geothermal resources in commercial quantities from any land leased from the State, the Board may notify the lessee in writing to drill an offset well thereto, and within one hundred twenty (120) days from the date of such notice or such additional time as may be allowed by the Chairman, the lessee shall commence operations for the drilling of an offset well on the leased land to the same zone as that zone from which such well is producing geothermal resources or shall unitize with the well that is draining State land or pay to the State compensatory royalty. For the purpose of this section an offset well shall mean a well which a reasonably prudent geothermal operator would drill under similar circumstances. Otherwise, there shall be no obligation to unitize or pay compensatory royalty. To the extent provided by law, the Board may require unitization of leases and lands involved.
- d. Subject to lessee's right to surrender a mining lease, where the Board determines that

production, use, or conversion of geothermal resources is susceptible of producing a by-product or by-products, including demineralized water contained in or derived from such geothermal resources and deemed suitable for beneficial use in accordance with the Hawaii Ground Water Use Act (Chapter 177), the Board may require substantial production or use thereof unless the Board determines that beneficial production or use would not be in the interest of conservation of natural resources, nor economically feasible or would not otherwise be in the public interest.

7.6 Protection of Other Resources.

- a. The lessee shall remove any derrick, equipment and/or facilities within sixty (60) days after lessee has ceased making use thereof in its operations.
- b. All permanent operating sites shall be landscaped or fenced so as to screen them from public view. Such landscaping or fencing shall be approved in advance by the state and kept in good condition.
- c. All drilling and production operations shall be conducted in such a manner as to eliminate as far as practicable dust, noise, vibration, or noxious odors. Operating sites shall be kept neat, clean and safe. Drilling dust shall be controlled to prevent widespread pollution. The determination as to what is detrimental rests solely with the Chairman.
- d. Wastes shall be discharged in accordance with all Federal, State and local requirements.
- e. Any operation disturbing the soil surface, including road building, construction, and movement of heavy equipment in support of or relating to specific geothermal exploration or development activities shall be conducted in such a manner as will not result in unreasonable damage to trees and plant cover, soil erosion, or degradation of water resources.
- f. Existing roads, except public roads, and bridges on or serving the area under lease shall be maintained in a condition equal to or better than that before use. New roads and bridges shall be located, constructed, and maintained in accordance with the appropriate county requirements.
- g. Marketable timber on State or reserved lands which are damaged, destroyed, or

used shall be compensated for at fair market value to the owners of the land. Borrow pit material shall not be obtained from State or reserved lands without permission and payment of market value to the owner.

- h. Improvements, structures, telephone lines, trails, ditches, pipelines, water developments, fences, permanent improvements and crops of the owners shall be protected from damage and repaired or replaced when damaged or monetary compensation paid to the owners for such damage.
- i. Access to drilling or production sites by the public shall be controlled by the lessee to prevent accidents or injury to persons or property.
- j. Areas cleared and graded for drilling and production facility sites shall be kept to a reasonable number and size, and be subject to Board approval.
- k. Lessee shall conduct its operations in a manner which will not interfere with the right of the public to use public lands and waters.

7.7 Suspension of Operations.

In the event of any disaster and pollution, or likelihood of either, having or capable of having a detrimental effect on public health; safety; welfare; or the environment caused in any manner or resulting from operations under a lease; the lessee shall suspend any testing, drilling and production operations, except those which are corrective, or mitigative, and immediately and promptly notify the Chairman. Such drilling and production operations shall not be resumed until adequate corrective measures have been taken and authorization for resumption of operations has been made by the Chairman.

7.8 Diligent Operations Required.

The lessee shall be diligent in the exploration or development of the geothermal resources on the

leased lands. Failure to perform diligent operations may subject the lease to termination by the Board. Diligent operations mean exploratory or development operations on the leased lands, including without limitation geochemical surveys, heat flow measurements, core drilling, or drilling of a well for discovery, evaluation, or production of geothermal resources.

7.9 Records and Reports.

- a. Lessee shall at all times maintain full and accurate records of production and payments relating to lessee's operations and activities upon and in connection with said leased lands. All books and records of lessee pertaining to or necessary in determining royalty payments shall be open to inspection at all reasonable times by the authorized representatives of the Department.
- b. The lessee shall furnish to the Board for its confidential use, copies of all physical and factual exploration results, logs and surveys which may be conducted, well test data, and other data resulting from operations under the lease. Such information shall be kept confidential as a trade secret for a period of one year from date of receipt, or longer at the discretion of the Board.

7.10 Restoration of Premises.

Upon the revocation, surrender or expiration of any mining lease, the lessor or surface owner may require the lessee to restore the lands covered by said lease to their original condition insofar as it is reasonable to do so within 90 days thereof, except for such roads, excavations, alterations or other improvements which may be designated for retention by the surface owner, the Board or any State agency having jurisdiction over the affected lands. When determined by the Board or such State agency, cleared sites and roadways shall be replanted with grass, shrubs or trees by the lessee.

PART II — DRILLING FOR GEOTHERMAL RESOURCES

RULE NO. 8 GENERAL

8.1 Purpose.

This Part shall apply to all lands within the State, including privately owned lands.

All wells drilled in the State of Hawaii for the exploration, discovery, evaluation, development, production, utilization or injection of geothermal resources and by-products shall be subject to Part II of these Regulations which are statewide in application; and shall be drilled, operated, and maintained or abandoned in such a manner as to prevent waste, to conserve and provide for optimum use of geothermal resources, to prevent degradation of the environment, surface and ground, and other natural resources, and to prevent injury to life and property.

8.2 Designation of Agent.

Any person who has drilled, is drilling, or proposes to drill any geothermal well shall designate on forms provided by the Department an agent who shall be a resident of the State of Hawaii and upon whom may be served all orders, notices, and processes of the Department or any court of law. Every person so appointing an agent shall, within five days after the termination of any such agency, notify the Chairman in writing of such termination, and unless operations are discontinued, shall appoint a new agent. All changes in the address of an agent must be recorded with the Chairman within five days of the change of the address.

RULE NO. 9 DRILLING OF GEOTHERMAL WELLS

9.1 Applications for Permit to Drill, Modify, Modify Use, or Abandon Wells; Permits.

Prior to the drilling, modifying, modifying use, or abandoning of any well, the operator of such well shall file with the Chairman an appropriate application for a permit to perform any such work and shall obtain approval thereof. Each application for a permit shall be made on forms provided by the Department and shall contain the following:

- a. Name, signature and address of the applicant, the owner of the mining rights and the land owner if the applicant is not the land owner.
- b. The number or other designation by which the well shall be known. Such number or designation shall be subject to the Chairman's approval.

- c. A plot plan showing the Tax Map Key, site elevation, and well location referenced to established property corners. A survey by a Hawaii licensed surveyor may be required by the Department, if deemed necessary.
- d. A statement by applicant of the purpose and extent of the proposed work and an estimate of the depths between which discovery, production, injection, or plugging will be attempted.
- e. A description of the proposed drilling and casing program; and a plan or drawing showing the proposed work and vertical section of the well.
- f. A statement by applicant agreeing to file a bond meeting the requirements of Rule 9.4 with the Chairman within 10 calendar days after notification that the application has been approved.
- g. A statement by applicant to perform the work and thereafter to operate and maintain the well in accordance with these Regulations and all other Federal, State and County requirements.

Applications for a permit shall be reviewed and acted upon by the Chairman within 60 calendar days after receipt.

Permits shall be valid for a period of 365 calendar days from date of issuance, but may be renewed for an additional period of 180 calendar days at the discretion of the Chairman.

A permit may be suspended or revoked by the Chairman. If it appears that any drilling or well work for which a permit has been issued is not being done in accordance with conditions of the permit or these Regulations, the Chairman shall notify the permittee to appear before him at a time and place designated in the Notice to show cause why the permit should not be suspended or revoked and the well be plugged and abandoned or put in proper condition by the permittee. The Notice shall state the grounds for suspension or revocation. After the hearing, the Chairman shall give his order as to revocation, suspension or continuation of the permit. The order shall be subject to appeal as provided in Rule 15.

9.2 Supplementary Applications.

A Supplementary Application must be filed with the Chairman if there is any contemplated change in the original approved application. Written approval of such change must be received from the

Chairman before such change of work is started. In an emergency or when deemed necessary by the Chairman, the Chairman may give verbal approval to the operator to carry out the intent and purpose of these drilling Regulations.

9.3 Filing Fees.

Each application for a permit to drill, modify, modify use or abandon a well shall be accompanied by a non-refundable filing fee in the amount of \$100.

9.4 Bonds.

- a. Any person who engages in the drilling, redrilling, deepening, maintaining, operating or abandoning of any well shall file with the Chairman prior to such activity, an indemnity bond in the amount set by the Board to protect the interests of the State, but in no case less than \$50,000 for each well or a blanket bond of \$250,000 for any number of wells. The amount of bond set by the Board shall include the cost of plugging and abandoning such well or wells in accordance with Rule 12 should it be necessary. The bond shall be executed by such person, as principal, and by a surety company qualified to do business in the State of Hawaii, as surety, conditioned that the principal named in the bonds shall faithfully comply with these Regulations. The bonds shall inure to and indemnify the State and surface owners against all losses, charges, expenses and claims for damages or injuries caused or resulting from the drilling and operation of the wells.
- b. Bonds shall remain in force for the life of the well or wells and may not be released until the well or wells are properly abandoned as determined by the Chairman or another valid bond is substituted therefor. Any person who acquires the ownership or operation of any well or wells shall within five days after acquisition file with the Chairman a new indemnity bond or a consent by the surety to the change in principal under the existing bond.

9.5 Set-Back and Well Spacing.

- a. Any well drilled for the discovery and/or production of geothermal resources or for injection of geothermal resources shall be located more than 100 feet from the outer boundary of the parcel of land on which the well is situated, or more than 100 feet from a public road, street, or highway dedicated prior to the commencement of drilling unless modified by the Chairman upon re-

quest. Where several contiguous parcels of land under one or more ownerships are operated as a single geothermal resources operating unit, the term "outer boundary line" means the outer boundary line of the lands included in such a unit.

- b. The Chairman shall approve proposed well spacing programs or prescribe such modifications to the programs as he deems necessary for proper development and conservation of geothermal resources, giving consideration to such factors as, but not limited to, topographic characteristics of the area, hydrologic, geologic, and reservoir characteristics of the area, the number of wells that can be economically drilled to provide the necessary volume of geothermal resources for the intended use, minimizing well interference, unreasonable interference with multiple use of lands, and protection of the environment.

9.6 Directional Drilling.

Where the surface of a parcel of land is unsuitable for drilling, a directionally drilled (other than a vertical direction) well may be located upon another parcel which may or may not be contiguous. The location of such a well shall be not less than 25 feet from the outer boundary of the parcel on which it is located and not less than 25 feet from an existing street or road. The production or injection interval of such a well shall be not less than 100 feet from the outer boundary of the parcel into which it is drilled. Directional well surveys shall be filed with the Department for all wells directionally drilled.

No well shall be intentionally deviated from the vertical without the Chairman's approval.

9.7 Casing and Cementing Requirements.

- a. *General.* All wells shall be cased in such a manner as to protect and to prevent or minimize damage to the environment, ground water resources, geothermal resources, life, health and property. The permanent well head completion equipment and all casing strings reaching the surface shall provide for adequate well pressure control, operational safety, and protection of all natural resources. Department specifications for casing strings shall be determined on a well-to-well basis. All casing strings reaching the surface shall provide adequate anchorage for blowout-prevention equipment, hole pressure control and protection for all natural resources. The casing requirements described below are general and should be

used as guidelines in submitting proposed casing programs required to be filed with Applications for Permit.

- b. *Conductor Pipe*. Conductor pipe shall be installed to a depth of a minimum of 50 feet and a maximum of 150 feet. In special cases the Chairman may allow conductor pipe to be run and cemented at deeper depths. The annular space between the hole and pipe shall be cemented solid to the surface.
- c. *Surface Casing*. Surface casing shall be installed to provide for control of formation fluids, for protection of ground water resources and for anchorage of blowout-prevention equipment. All surface casing shall be cemented solid to the surface.

Surface casing shall be set to a minimum depth of ten percent of the proposed total depth of the well or 500 feet, whichever is greater. If useable basal ground water is present or reasonably suspected to exist in the area, the depth of the surface casing shall be approved by the Chairman. If subsurface geological, hydrological, or geothermal conditions are known in or in the vicinity of the area to be drilled, such conditions shall be used in determining and approving the depth of surface casing. A second string of surface casing may be required if the first string has not been cemented through a sufficient series of low permeability, competent rock formations and either a rapidly increasing thermal gradient or rapidly increasing formation pressures are encountered.

- d. *Intermediate Casing*. Intermediate casing shall be required for protection against anomalous pressure zones, cave-ins, washouts, abnormal temperature zones, uncontrollable lost circulation zones or other drilling hazards. Intermediate casing strings shall be cemented solid to the surface.
- e. *Production Casing*. Production casing may be set above or through the producing or injection zone and cemented above such zones. Sufficient cement shall be used to exclude overlying formation fluids from the zone, to segregate zones and to prevent movement of fluids behind the casing into zones that contain ground water. Production casing shall either be cemented solid to the surface or lapped into intermediate casing, if installed. If the production casing is lapped into an intermediate string, the casing overlap shall be at least 50 feet, the lap

shall be cemented solid and the lap shall be pressure tested to ensure the integrity of the lap.

In order to reduce casing corrosion, production casing used to produce corrosive brine reservoirs shall be of the same nominal inside diameter from the shoe of the casing to the ground surface unless waived by the Chairman.

- f. *Cement*. All cement used in cementing the various types of casing required herein shall contain a high temperature resistant admix, unless this cement requirement is waived by the Chairman in accordance with the particular circumstances existing in the well or the area.

9.8 Mud Return Temperature Logging.

The temperature of the return drilling mud shall be monitored continuously during drilling of the surface casing portion of the drill hole. Either a continuous temperature monitoring device shall be installed and maintained in working condition, or the temperature shall be read manually. In either case, return mud temperatures shall be entered into the log book after each joint of pipe has been drilled down (about every 30 feet).

9.9 Electric Well Logging.

All wells, except observation wells, shall be logged with an induction electrical log, or other approved log from total depth to the bottom of the conductor pipe before installing casing, except in the case where air is used as the drilling medium. This requirement may vary from area to area, depending upon the amount of subsurface geological or hydrological data available, and may not be required from total depth of the well under certain conditions, subject to the approval of the Chairman.

9.10 Blowout-Prevention Equipment.

- a. *General*. Blowout-prevention equipment (BOPE) capable of shutting-in the well during any operation shall be installed on the surface casing tested, and maintained ready for use at all times. As deemed appropriate, BOPE pressure tests may be observed by the Chairman or his designated representative on all exploratory wells prior to drilling out the shoe of the surface casing. The decision to require and observe BOPE pressure tests on other types of wells shall be made on a well-to-well basis. In any case, the Chairman must be contacted well in advance of a scheduled pressure test to allow time for travel to the well site to witness the test.

BOPE installations shall include high temperature-rated packing units and ram rubbers if available and shall have a minimum working-pressure rating equal to or greater than the lesser of: (1) a pressure equal to the product of the depth of the BOPE anchor string in feet times one (1) psi per foot; (2) a pressure equal to the rated burst pressure of the BOPE anchor string; or (3) a pressure equal to 2000 psi.

b. *BOPE Classes*. The requirements for blowout-prevention equipment shall be subject to review and modification by the Chairman and the following standards are given as guidelines for preparation of minimum blowout-prevention programs.

(1) **NO BOPE**: No BOPE is required for known shallow, low temperature, low pressure areas where down-hole water temperatures are less than 100 degrees Celsius at depths less than 500 feet or where temperatures and pressures are unknown and the proposed depth of drilling is less than 500 feet.

(2) **CLASS 2M BOPE (API CLASS 2M-A or 2M-RE)**: Required for low pressure areas where known temperatures are above 100 degrees Celsius at depths less than 2,000 feet, or where subsurface temperatures and pressures are unknown and the proposed depth of drilling is less than 2,000 feet. Equipment shall include: an annular BOPE or pipe-ram/blind-ram BOPE with minimum working-pressure ratings of 1,000 psi installed on the surface casing so that the well can be shut-in at any time; hydraulic and/or manual actuating system; kelly cock; a fill-up line installed above the BOPE; a kill line installed below the BOPE, leading directly to the mud pumps and fitted with a valve through which cement could be pumped if necessary; and a blow-down line fitted with two valves installed below the BOPE. The blow-down line shall be directed in such a manner so as to permit containment of produced fluids and to minimize any safety hazard to personnel.

(3) **CLASS 3M BOPE (API CLASS 2M-RSRA or EQUIVALENT)**: Required for medium pressure areas where subsurface pressures are less than 1000 psi or where pressures are unknown and the proposed total depth

of the well is greater than 2000 feet. Equipment shall include: annular BOPE and pipe-ram/blind-ram BOPE with a minimum working-pressure rating of 2,000 psi installed on the surface casing so that the well can be shut-in at any time and with a double-ram preventer having a mechanical locking device; a hydraulic actuating system utilizing an accumulator of sufficient capacity and a high pressure auxiliary backup system equipped with dual controls, one at the driller's station and one at least 50 feet away from the well head; kelly cock and standpipe valve; a fill-up line installed above the BOPE; a kill line installed below the BOPE, leading directly to the mud pumps and fitted with a valve through which cement could be pumped if necessary; and a blow-down line fitted with two valves installed below the BOPE with blow-down line directed in such a manner as to permit containment of produced fluids and to minimize any safety hazard to personnel.

(4) **CLASS 1A BOPE**: Required in areas where dry steam is known to exist and/or formation pressures are less than hydrostatic and air is used as the drilling medium. Equipment shall include: a rotating-head installed at the top of the BOPE stack; a pipe-ram/blind-ram BOPE, with a minimum working-pressure rating of 1,000 psi, installed below the rotating-head so that the well can be shut-in at any time; a banjo-box steam diversion unit installed below the double-ram BOPE, fitted with a muffler capable of lowering sound emissions to within acceptable standards; a blind-ram BOPE, with a minimum working-pressure rating of 1,000 psi, installed below the banjo-box so that the well can be shut-in while removing the rotating-head during bit changes; a gate valve required on final casing string to be cemented back to surface, with a minimum working-pressure rating of 300 psi, installed below the blind-ram so that the well can be shut-in after the well has been completed, prior to removal of the BOPE stack; all ram-type BOPE shall have a hydraulic actuating system utilizing an accumulator of sufficient capacity and a high-pressure

backup system; dual control stations for hydraulic backup system, one at the driller's station and the other at least 50 feet away from the well head; kelly cock and standpipe valves; a kill line installed below the BOPE, leading directly to the mud pumps and fitted with a valve through which cement could be pumped if necessary; and a blow-down line fitted with two valves installed below the BOPE. This line shall be directed so as to minimize any safety hazard to personnel. If any portion of a well is drilled using mud, Class 2M BOPE shall be installed on the surface casing so that the well can be shut-in at any time.

9.11 Well Completion.

A well is considered to be completed 30 days after drilling operations have ceased and the well is capable of producing a geothermal resource, or 30 days after it has commenced to produce a geothermal resource, unless drilling operations are resumed before the end of the 30-day period. For the purpose of filing well records, the time limit of 60 days begins either when, the well commences production or injection, the drilling operations are suspended for more than 30 days, or the well is abandoned.

9.12 Well Tests.

The Chairman shall require such well tests or remedial work as in his judgment are necessary to prevent and minimize damage to life, health, property, natural resources, geothermal resources, ground water resources, and the environment. Types of tests may include casing tests, cementing tests, directional tests and equipment tests.

All casing strings shall be pressure tested after cementing and before commencing any other operations on the well. Minimum casing test pressure shall be approximately one-third of the manufacturer's rated internal yield pressure except that the test pressure shall not be less than 600 pounds per square inch and need not be greater than 1500 pounds per square inch. In cases where combination strings are involved, the above test pressures shall apply to the lowest pressure-rated casing used. Test pressures shall be applied for a period of 30 minutes. If a drop of more than ten percent of the test pressure should occur, the casing or cement job shall be considered defective and corrective measures shall be taken before commencing any further operations on the well.

If the cementing of any casing appears to be defective, or if the casing in any well appears to be defective or corroded or parted, or if there appears to

be any underground leakage for whatever other reason which may cause or permit underground waste, the operator shall proceed with diligence to use the appropriate method or methods to eliminate such hazard. If such hazard of waste cannot be eliminated, the well shall be plugged and abandoned in accordance with a plugging program approved by the Chairman.

All wells shall be tested to determine the deviation from the vertical at maximum intervals of 500 feet or less.

RULE NO. 10 WELL MODIFICATION FOR INJECTION

10.1 Injection Wells.

Injection wells are those wells used for disposal of geothermal waste fluids, for the augmentation of geothermal reservoir fluids, for maintenance of reservoir pressures, or for any other purpose authorized by the Chairman. New wells may be drilled or old wells may be modified for such injection purposes.

10.2 Permit Required.

Prior to modification of existing wells for injection purposes, an appropriate Application for Permit must be filed with the Chairman together with filing fee, as required in Rule 9.1. Modification work shall not commence until a permit has been issued by the Chairman.

10.3 Surveillance of Injection Wells.

Surveillance of injection wells shall be necessary in order to establish that all injection effluent is confined to the intended zone of injection. When an owner or operator proposes to drill a new well or modify an existing well he shall be required to demonstrate to the satisfaction of the Chairman that the casing has complete integrity by approved test methods.

To establish the integrity of the annular cement above the shoe of the casing, the operator shall make sufficient surveys, within 30 days after injection is started into a well, to demonstrate that all the injected fluid is confined to the intended zone of injection. Thereafter, such surveys shall be made at least every two years, or more often when ordered by the Chairman. All such surveys shall be witnessed by the Chairman.

After the injection well has been put into service, the Chairman may visit the well site periodically. At these times, surface conditions shall be noted and if any unsatisfactory conditions exist, the operator shall be notified of needed remedial work. If this required work is not performed within 90 days,

the permit issued for such well by the Chairman shall be rescinded. If it is determined that damage is occurring, the Chairman may order that the repair work be done immediately.

Injection pressures shall be recorded and compared with the pressure reported on the appropriate forms. Any discrepancies shall be rectified immediately by the operator. A graph of pressures and rates versus time shall be maintained by the operator. Reasons for anomalies shall be promptly ascertained. If these reasons are such that it appears damage is being done, the permit issued by the Chairman may be rescinded, and injection shall cease.

At the discretion of the Chairman, when an injection well has been left idle for a period of two years or longer, the operator shall be informed by letter that the permit issued for use of the well for injection purposes has been rescinded. In the event the operator intends again to use the well for injection purposes, he shall be required to file a new Application for Permit and demonstrate to the satisfaction of the Chairman by means of surveys that the injected fluids will be confined to the intended zone of injection.

RULE NO. 11

WELL OPERATION AND MAINTENANCE

All wells and their appurtenances such as well head, separators, pumps, mufflers, scrubbers, manifolds, valves and pipelines shall be operated and maintained by the operator in good working condition in order to prevent unacceptable pollution, waste and the loss of or damage to life, health, property, natural resources, and environment. The well head and appurtenances of all wells shall meet a test pressure of at least one and a half times the calculated or known pressure of the geothermal reservoir tapping or to be tapped by the well.

Periodic corrosion surveillance of any well and appurtenances may be conducted by the Chairman or his authorized representative and any leakage, waste, or hazard shall be promptly corrected by the operator.

The operator of any well shall notify the Chairman of any blowout, break, leak or spill of any well or appurtenant facilities. The notification to the Chairman shall consist of a written report submitted within ten days after discovery of the incident.

The Chairman shall notify the operator of any well not being operated or maintained in accordance with these Regulations to take whatever steps may be necessary to remedy the defect at the operator's expense within the period of time specified in such Notice. If the operator fails to comply with such

Notice and remedy the defect within the specified period, the Chairman may do such work as may be necessary to plug and abandon the well or put it in proper condition at the expense of the operator or his surety and he may take necessary action to enforce the penalty provided in these Regulations.

RULE NO. 12

WELL ABANDONMENT

12.1 Notice of Intent to Abandon; Permit; Filing Fee.

The operator of any well proposed to be abandoned must file with the Chairman an Application for Permit to Abandon, prior to said abandonment. The operator's proposed plans for abandonment shall be subject to approval and revision prior to the issuance of a permit by the Chairman. Each such application to abandon a well shall be accompanied by a non-refundable filing fee of \$100.

12.2 General Requirements.

- a. The operator of any well shall promptly plug and abandon any well that is deserted, not in use, is deemed not to be potentially useful, is wasting geothermal or ground water resources, or is irreparably damaged. No well shall be plugged and abandoned until the manner and method of plugging have been approved or prescribed by the Chairman.
- b. Before any work is commenced to abandon any well, notice shall be given by the operator to the Chairman, which notice shall show the condition of the well and the proposed method of abandonment. Unless otherwise specified in the Plan of Operation, no well may be abandoned except as prescribed herein. However, the operator of a lease shall promptly plug and abandon any well that is deserted, not used or deemed useful by the Board. No well capable of producing in commercial quantities may be abandoned until receipt of written approval by the Chairman. Equipment shall be removed and premises at the well site shall be restored as near as reasonably possible to its original condition immediately after plugging operations are completed on any well except as otherwise authorized by the Chairman. When drilling operations have been temporarily suspended drilling equipment shall not be removed from any well without taking adequate measures to close the well and protect subsurface resources. Upon failure of lessee to comply with any requirements under this rule, the Chairman is authorized

to cause the work to be performed at the expense of lessee and the surety.

- c. Good quality, heavy drilling fluid approved by the Chairman shall be used to replace any water in the hole and to fill all portions of the hole not plugged with cement.
- d. Subsequent to plugging and abandonment operations in the hole, casings shall be cut off at least 6 feet below the surface of the ground, all concrete cellars and other structures shall be removed, and the surface location restored, as near as practicable, to original conditions.
- e. A History of Geothermal Resources Well shall be filed within 60 days after completion of abandonment; except in the case of an exploratory well such report shall be filed within six months after abandonment.
- f. Any bond or rider thereto covering the well shall remain in full force and effect until the well is properly abandoned and the surface properly restored. Written approval of the abandonment must be obtained from the Chairman before any bond is released.

12.3 Cementing Requirements.

- a. Cement used to plug any well, except that cement or concrete used for surface plugging, shall be placed in the hole by pumping through drill pipe or tubing. Such cement shall contain a high temperature resistant admix unless this requirement is waived by the Chairman in accordance with the particular circumstances existing in that well or area. All open annuli shall be filled solid with cement to the surface.
- b. One hundred (100) lineal feet of cement shall be placed straddling the bottom of the conductor pipe and at the shoes of all casings.
- c. Cement shall be placed solidly across geothermal zones and extending 100 lineal feet above and below such zones, whether in uncased or cased (perforated) hole, except as follows:
 - (1) One hundred (100) lineal feet of cement shall be placed straddling casing stubs and laps. If unable to enter casing stubs or laps, 100 lineal feet of cement shall be placed above the top of the stubs or laps.
 - (2) If casing is collapsed, etc., cement shall be placed solidly in geothermal zones or perforated sections of casing and ex-

tending 100 lineal feet above such zone or perforated section by squeezing with a retainer or braden head.

- d. Fifty (50) lineal feet of cement shall be placed above the top of casing liners.
- e. A surface plug consisting of a minimum of 50 lineal feet of neat cement or ready mix concrete shall be placed below the surface of the well.
- f. Where a well has been drilled with air, a bridge plug may be placed at the deepest cemented casing shoe and the bridge plug shall be capped with a minimum of 200 lineal feet of cement.

RULE NO. 13 WELL RECORDS AND REPORTS

13.1 Well Records.

The operator of any geothermal well shall keep, or cause to be kept, a careful and accurate log, core record, and history of the drilling of the well, including lithology and depths of formations encountered; cores; water-bearing and geothermal heat-bearing strata and their depths, pressures and temperatures; and such other well surveys and logs of temperature, chemical, radioactive, and electrical characteristics of the well. These records shall be kept within the State of Hawaii in the local office of the operator or his designated agent and together with all other reports of the operator, shall be subject, during business hours, to the inspection of the Chairman. The Board may also require such additional data or reports relating to production or utilization of geothermal resources and by-products as may appear to be necessary or desirable, either generally or specifically, for the prevention of waste and the optimum use of geothermal, water and other natural resources of the State.

13.2 Reports to be Filed.

Within six months after the completion of any well or completion of any deepening, re-drilling, plugging, altering or abandonment work, the operator shall file with the Department of Land and Natural Resources in Honolulu, Hawaii, the following well reports on forms provided by the Department:

- a. *Drilling Log and Core Report.* The Drilling Log and Core Report shall show the lithologic characteristics and depths of formations encountered, the depths and temperatures of ground water-bearing and geothermal resources-bearing strata, and the temperatures, chemical compositions, and other chemical and physical charac-

teristics of fluids encountered from time to time, so far as ascertained. The report shall show the depth, lithologic character and fluid content of cores obtained, so far as determined.

- b. *Well History Report.* The Well History Report shall describe in detail the chronological order on a daily basis all significant operations carried out and equipment used and shall be submitted upon completion of drilling, testing, completion, recompletion and abandonment of a well.
- c. *Well Summary Report.* The Well Summary Report shall show data pertinent to the condition of a well at the time of completion of work done. Well locations shown on this form shall be surveyed by a licensed surveyor.
- d. *Supplementary Notice.* Reports on any other operations not specifically mentioned herein which affect the previous reported status of a well shall be reported on the Supplementary Notice form.
- e. All reports shall be the property of the State with the right to utilize the same.

13.3 Monthly Production and Injection Reports to be Filed.

The operator of any well which is producing geothermal resources or by-products or is being used for injection purposes shall file with the Chairman on or before the 30th day after the end of each month a report on the amount of geothermal resources produced, sold and used, and the amount of fluid injected for that month as the case may be.

RULE NO. 14 ENVIRONMENTAL PROTECTION

- a. Protection of the environment includes responsibility of the operator of any well to: conduct exploration, drilling, and development operations in a manner deemed necessary by the Chairman to provide maximum protection of the environment; rehabilitate disturbed lands; take all precautions deemed necessary by the Chairman to protect the public health and safety; and conduct operations in accordance with the intent and objectives of these Regulations and all other applicable Federal, State, and County environmental legislation.
- b. Adverse environmental impacts from geothermal-related activity shall be prevented or mitigated through enforcement of these regulations and of all other applicable

Federal, State, and local standards, and the application of existing technology. Inability to meet these environmental standards or continued violation of environmental standards by any well operator after due notification, may be construed as grounds for the Chairman to order a suspension of well operations.

- c. The operator of any well shall be responsible for monitoring of readily identifiable localized environmental impacts associated with specific activities that are under his control. Monitoring of environmental impacts may be conducted by the use of aerial surveys, inspections, periodic samplings, continuous records, or by such other means or methods as required by the Chairman. Due to the differing natural environmental conditions among geothermal areas, the extent and frequency of such monitoring activities will be approved by the Chairman on an individual well basis. In the event the Chairman determines that the degree and adequacy of existing environmental protection regulations in certain areas are insufficient, the Chairman may establish additional and more stringent requirements.

The operator of any well shall provide for acquisition of adequate environmental baseline data prior to submission of a plan for production. Techniques and standards to be used by the operator for meeting these requirements shall be subject to the approval of the Chairman.

- d. *Aesthetics.* The operator of any well shall reduce visual pollution, where feasible, by the careful selection of sites for operations and facilities. The design and construction of facilities shall be conducted in a manner such that the facilities will blend into the natural environmental setting of the area by the appropriate use of landscaping, vegetation, compatible color schemes, and minimum profiles. Native plants or other compatible vegetation shall be used, where possible, for landscaping and revegetation.
- e. *Land Use and Reclamation.* Drilling and operating plans shall be designed so that such operations will result in the least disturbance of land, water, and vegetation. Existing roads shall be used where feasible. Entry upon certain environmentally fragile land areas may be either seasonally restricted or restricted to special vehicles or transportation methods which will

minimize disturbance to the surface or other resources as specified by the Chairman.

Plans for drilling operations shall provide for the reclamation and revegetation of all disturbed lands in a manner approved by the Chairman. Land reclamation may include preparation and seeding with prescribed wildlife food and plant cover or improved and acceptable substitutes thereof, which will equal or enhance the food values for indigenous wildlife species and domesticated animals. Temporary fencing for such reclaimed areas may be required to facilitate restoration thereof.

f. *Slope Stability and Erosion Control.* Operations shall be conducted in such a manner so as to minimize erosion and disturbance to natural drainage. The operator of any well shall provide adequate erosion and drainage control to prevent sediments from disturbed sites from entering water courses for soil and natural resource conservation protection.

g. *Biota.* The operator of any well shall conduct all operations in such manner as to provide reasonable protection of fish, wildlife, and natural habitat. The operator shall take such measures as are necessary for the conservation of endangered and threatened species of flora and fauna.

h. *Cultural Resources Preservation.* The operator of any well shall exercise due diligence in the conduct of his operations to protect and preserve significant archaeological, historical, cultural, paleontological, and unique geologic sites.

Previously unknown sites discovered during any operations shall be immediately reported to the Chairman, and operations on that site shall cease until said site can be assessed for its archaeological value.

i. *Air and Noise Pollution; Effluent Disposal.* The operator of any well shall comply with all applicable Federal, State, and local standards with respect to air, land, water, and noise pollution, and the disposal of liquid, solid, and gaseous effluent. Immediate corrective action approved or prescribed by the Chairman shall be taken in all cases where pollution has occurred or abatement is deemed necessary. The disposal of well effluents shall be done in such a manner as to not constitute a hazard to surface or ground water resources.

j. The operator of any well shall design, plan, and conduct all well drilling, casing and cementing operations in such a manner as to provide for protection of all useable ground water resources from exhaustion, depletion, waste, pollution and salt water encroachment, or the threat thereof.

PART III — OTHER PROVISIONS

RULE NO. 15

APPEAL

Unless provided otherwise, any person adversely affected thereby may appeal to the circuit court from any ruling of the Board pursuant to Chapter 91, HRS.

RULE NO. 16

PENALTIES

After written notice and failure to correct any violation of these Regulations within the time prescribed in the notice, any person violating Part II of these Regulations shall be fined not more than \$500 for each offense; and where continuance of waste, degradation, or damage of resources is immediately controllable, each day's continuance of the same shall constitute a separate offense; provided, that when the continuance of the waste, degradation, or damage of resources cannot be immediately controlled, as where recasing or sealing is necessary, each day's continuance of the same shall constitute a separate offense after 60 days have elapsed from the time of receiving written notice to prevent waste. For violations under Rule 13 each day's continuance of the same shall constitute a separate offense after 30 days have elapsed from the time of written notice of violation.

RULE NO. 17

INJUNCTIONS

If it appears to the Board that any person has engaged or is about to engage in any act or practice constituting a violation of these Regulations or any rule, regulation, or order of the Board, the Board may bring an action in the appropriate circuit court to enjoin any such acts or practices and to enforce compliance with these Regulations or any rule, regulation, or order of the Board. Upon a proper showing, the court shall grant a restraining order, temporary or permanent injunction, or other appropriate relief. The Board shall not be required to post a bond.

RULE NO. 18

RIGHT OF ENTRY

Any authorized representative or employee of the Department shall have free access and right of entry to all wells, producing facilities and their appurtenances for the purpose of inspecting or testing wells and equipment and for the purpose of determining compliance with these Regulations.

RULE NO. 19

SEVERABILITY

The provisions of these Regulations are severable. If any provision or application of these Regu-

lations is held invalid, such invalidity does not affect other provisions or applications of these Regulations which can be given effect without the invalid provision or application.

The Board of Land and Natural Resources on March 10, 1978, approved and adopted these rules and regulations as Regulation 8 of the Department of Land and Natural Resources.

STATE OF HAWAII

By W. Y. Thompson

Chairman and Member

Board of Land and Natural Resources

And by Stanley W. Hong

Member

Board of Land and Natural Resources

Approved as to form:

Johnson H. Wong

Deputy Attorney General

Dated: April 10, 1978

Approved this 8th day
of May, 1978

George R. Ariyoshi

Governor of Hawaii

Effective May 19, 1978

PUBLICATION OF NOTICE OF PUBLIC HEARING

Sunday Star Bulletin & Advertiser, May 8, 1977

Star Bulletin, May 11, 1977

Hawaii Tribune-Herald, May 11 & 17, 1977

Maui News, May 18, 1977

Garden Island, May 25, 1977